

REVIEW OF THE TAIVALJÄRVI MINE PLANNING

Introduction

Outotec (Finland) Oy was commissioned by Sotkamo Silver Oy to review the mining section of the Taivaljärvi Mine Bankable Feasibility Study prepared by Wardell Armstrong International (WAI), March 2012. The main findings of the review are commented in this report.

The review work was done by Pekka Lovén, MSc(Mining), MAusIMM(CP) of Outotec (Finland) Oy, a Competent Person as defined by Joint Ore Reserves Committee (JORC, 2004).

This report is based on the following information:

- The Executive Summary and the Mining section of the Taivaljärvi Mine Bankable Feasibility Study prepared by WAI, March 2012.
- WAI mine designs in Datamine formats
- Sotkamo Silver mine designs in Surpac formats
- Sotkamo Silver Ore Reserve calculations in Excel format

In preparing this report, Outotec (Finland) Oy has relied on the information provided by Sotkamo Silver Oy. Outotec (Finland) Oy has no reason to believe that this information is materially misleading, incomplete or contains material errors.

Mining method selection

The selection of the mining method(s) is a key issue in the mine planning as it has influences on all other aspects of the mine design.

The mining method selected by WAI is transversal bench and fill stoping with cemented rockfill (CRF). The sublevel interval is 20 m, the stope and pillar widths are 10 meters and the length equals to the ore width within cut off limits. The mining starts from the base of reserves and proceeds upwards.

Comments:

- The transversal orientation of stopes and pillars requires the development of footwall drifts on every sublevel in the waste rock to provide stope access. This has an adverse effect on the mining cost. On the other hand footwall laterals offer a good location for production definition drilling (either diamond or sludge drilling).
- The stope size is small (20m x 10m x 5-25m), generally less than 10 000 tonne. According to the geotechnical studies the ground conditions are of fair to good quality and could allow larger stable open spaces. The small stope size (number of

active stopes required to keep up production) may cause scheduling problems (slot raising, back filling).

- The deposit consists of a series of sub-parallel lenses which are separated by under cut off mineralization or waste material. The transversal mining does not allow practical measures to separate close spaced lenses and leads to internal waste rock dilution.
- The proposed backfill method using crushed waste rock and cement slurry mixed on surface and delivered to stopes via large diameter drill hole is proven technology as such but taking the stope size and stope locations into account impractical and too expensive in the Taivaljärvi case.

Recommendations

- As Taivaljärvi deposit is a narrow, tabular orebody, it is author's opinion that the longitudinal bench and fill stoping will lead to better development-stoping ratio and less waste development than the transversal one and hence improve the economy. The selected sublevel interval of 20 m is also suitable for longitudinal mining. There are some areas in the ore body where the thickness exceeds 25m and sublevel open stoping with delayed backfilling can be utilized.

Mining schedule

The Taivaljärvi ore body out crops and part of it is amenable to conventional open pit mining. The open pit ore reserve according to the study is: 201 000 t @ 93.2 g/t Ag. Rest of the 3.0 Mt ore reserves are underground reserves.

The WAI study assumes the mining to begin from the underground mine and the open pit will be taken into production not until the third year after startup. It is the author's opinion that it should be considered to start production simultaneously from the open pit and the underground mine in order to ease the underground mine development schedule and improve the overall economy of the project.

Sotkamo Silver Oy mining plan

In addition to the WAI mining plan the author audited also the mining plan prepared by Sotkamo Silver Oy.

This mining plan assumes the longitudinal bench-and-fill mining method with a combination of cemented rock fill and uncemented waste fill. The sublevel interval is the same as in the WAI study ie. 20 m.

According to the mining schedule the production starts from the open pit and from the 140 level in the underground mine simultaneously. By doing this the head grade is higher and the haulage cost and hence the mine operating cost is lower compared to case where the production starts from the bottom of the reserves. The geometry of the ore body is such that the need for a sill pillar is quite small and does not have influence on the ore reserve.

The Ore Reserve by Sotkamo Silver Oy shown in the Table below is derived from the stope by stope mining plan taking into account the mining recovery of 90% (95% , open pit) and waste rock dilution of 10% (5%, open pit). The diluting grade has been defined from block model; Ag 31.3, Au 0.078, Zn 3600 and Pb 1300 ppm. This diluting grade represents average mineralized rock outside planned stopes.

Sotkamo Silver Oy Ore Reserve Statement for the Taivaljärvi Silver mine									
Category	Ore Tonnes	Zinc		Lead		Gold		Silver	
		Grade	Metal	Grade	Metal	Grade	Metal	Grade	Metal
	Mt	%	t	%	t	g/t	oz	g/t	oz
Proven	1.19	0.65	7 740	0.34	4 011	0.28	10 620	90.18	3 442 141
Probable	1.78	0.65	11 562	0.31	5 500	0.23	13 128	83.40	4 786 353
Total Proven & Probable	2.97	0.65	19 301	0.32	9 511	0.25	23 748	86.11	8 228 494

Table. Taivaljärvi Ore Reserve by Sotkamo Silver Oy.

The conversion factors, mining recovery and waste rock dilution applied, are considered to be challenging but achievable with good mine planning and execution practices and taking the good to fair ground conditions into account.

As a whole the mining plan together with the production schedule of Sotkamo Silver Oy is well in line with the experience of the author from similar type of deposits, fulfills the requirements of the JORC code and is suitable for economic and financial calculations.

Espoo 20.4.2012



Pekka Lovén

Pekka Lovén

April, 20th 2012

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CERTIFICATE of AUTHOR

I, **Pekka Lovén**, MAusIMM(CP), MSc (Mining), do hereby certify that:

1. I am a Senior Technology Advisor – Mining of Outotec (Finland) Oy, Riihitontuntie 7 E, 02200 Espoo, Finland
2. I graduated with MSc degree in Mining Engineering from Helsinki University of Technology in 1980.
3. I am a Member of the Australian Institution of Mining and Metallurgy with Chartered Professional accreditation
4. I have worked as a mining engineer for a total of 32 years since my graduation from the university.
5. I am a Competent Person in accordance with the JORC Code (2004).
6. I am not aware of any material fact or material change with respect to the subject matter of the report that is not reflected in the report, the omission to disclose which makes the report misleading.
7. I am independent of Sotkamo Silver Oy
8. I have read the guidelines of JORC (2004) with regards to the reporting of Mineral Resources and Ore Reserves

Dated this 20th day of April, 2012.



Pekka Lovén